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GEOGRAPHIC SCHOOL BULLETINS

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George W. Goddard

ON MINDORO HIS FILED-TOOTH SMILE IS A MANGYAN TRADEMARK

The Mangyans live in the undeveloped interior of Mindoro, forest-covered Philippine island lying 75 to 150 miles south of Manila. The tribe is noted for its unspoiled friendliness. This couple, however, appears to be divided on the issue of friendliness for the photographer. Their Sunday-best dress, shown here, is worn more for adornment than for covering. More backward tribespeople wear practically nothing. Both men and women file their teeth to the gums. Their insular home ranks seventh in size among the 7,000 islands of the Philippine group (Bulletin No. 1).

GEOGRAPHIC SCHOOL BULLETIN

HOW TEACHERS MAY OBTAIN THE BULLETINS

The Geographic School Bulletins are published weekly throughout the school year (thirty issues) and will be mailed to teachers in the United States and its possessions for one year upon receipt of 25 cents (stamps or money order); in Canada, 50 cents. Originally entered as second-class matter January 27, 1922; re-entered as of April 27, 1943, Post Office, Washington, D. C., under Act of March 3, 1879. Copyright, 1945, by National Geographic Society, Washington 6, D. C. International copyright secured. All rights reserved. Quedan reservados todos los derechos.

Mindoro, Close to Manila, One of Wildest of Philippines

MOUNTAINOUS Mindoro, second Philippine way station on General MacArthur's road back to Manila, has remained one of the least developed of the larger islands of the Philippine group. After 44 years of United States stewardship Mindoro's level of progress is still far below that of near-by Luzon.

Seventh in size among the more than 7,000 islands of the archipelago, Mindoro ranks just ahead of long-contested Leyte. It is half as large as New Jersey.

Forests which make Mindoro the most heavily wooded of the Philippines reach to the shore of the rugged island at most points. Grassy coastal plains exist only along part of the east coast and in the southwest portion where the original landing was made. Cultivation of sugar cane, abacá (incorrectly called "manila hemp"), sisal fiber, tobacco, rice, and other crops was carried on along these coasts. Parts of the eastern lowlands are swampy, hot, and unhealthful, but the Yanks landed on the sugar-cane plains where the climate is more healthful and temperatures moderate.

Wild Interior Is Inhospitable to Invading Armies

Center of this southwest plain is San José, six miles inland. It is 150 miles almost due south of Manila. A short railway connects San José's sugar industries with warehouses and wharves on the coast at Caminawit Point. The first airplane landed at San José nearly two decades ago. Today it is reported that there are eight or more airfields on the island.

Escarceo Point on Mindoro's northern coast is only 75 miles south of Manila and virtually within eyeshot of Batangas on Luzon, whence railroad and highway lead directly north to Manila. Verde Island Passage between the two islands narrows to only nine miles between Escarceo and Malacot points.

Mindoro's wild highland interior may remind Yanks of New Guinea. Deep penetration by opposing armies is difficult. The island's only good road connects Calapan, on the northeast, with Bongabong, well south on the east coast. Elsewhere, coast towns and inland villages connect by water route except for crude mountain trails.

From Mt. Calavite, rising 5,000 feet on the peninsula at the island's northwestern tip, a heavily wooded ridge runs east to majestic Mt. Halcon, 8,488 feet, at the center of Mindoro's northern coast. From this crown, ranges run toward the island coasts in all directions, making the interior a jumbled mass of rugged mountains.

Mindoro Is "Greenland Type" of Place Name; Has No Gold

Tagalogs live along the north coast of Mindoro; Visayans on the south. In the interior are a dozen tribes, with the Mangyans predominant (illustration, cover). Friendly and unspoiled, they are good musicians, playing ukuleles strung with human hair, and bamboo flutes. They telegraph from village to village on the resonant roots of a tree whose spiderlike legs may meet the main trunk as high as 20 feet above the ground.

Estimates of the population range from 25,000 to 106,000 persons. Before Pearl Harbor the Mindorans were chiefly engaged in subsistence agriculture, but at one time they produced so much rice that their island was called "the granary of the Philippines." During the Spanish era, repeated attacks by Moro pirates

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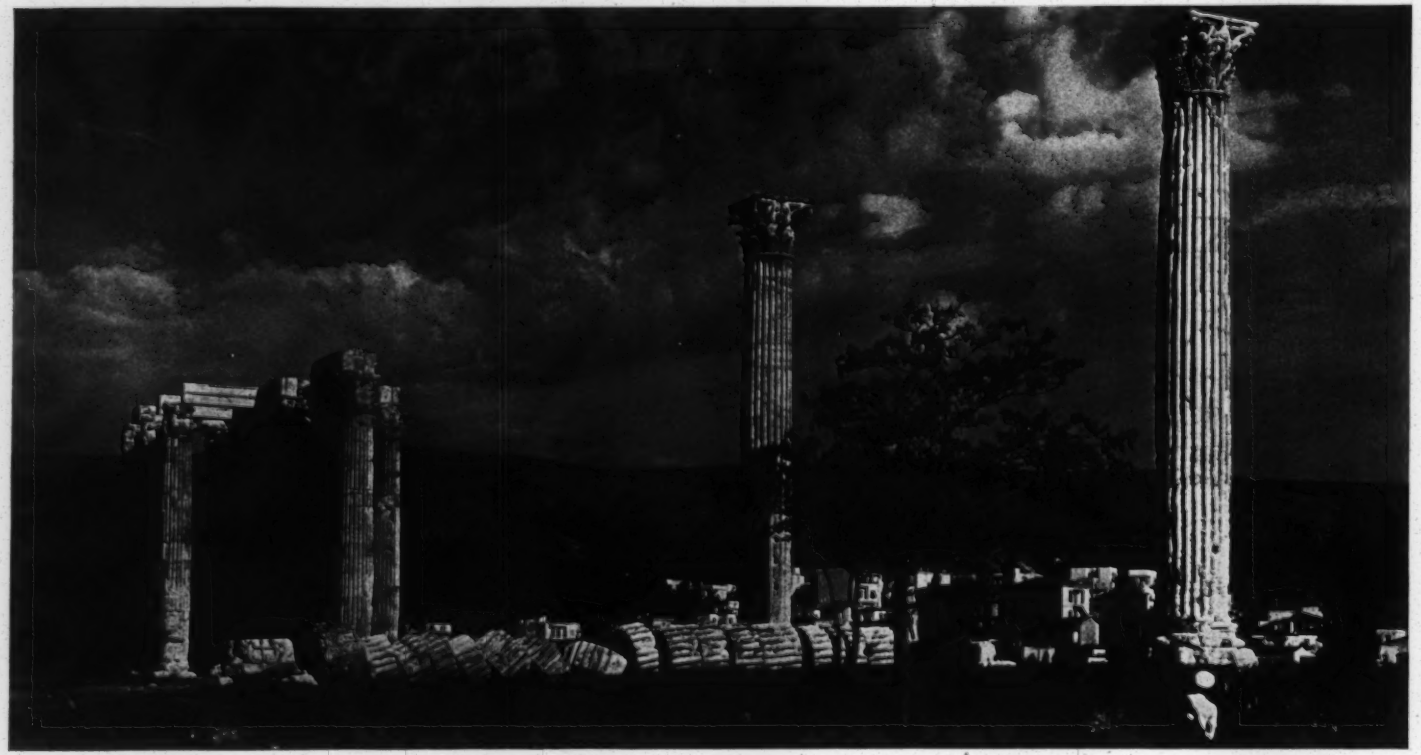

B. Anthony Stewart

ANCIENT COLUMNS OF GREECE'S LARGEST PAGAN TEMPLE FRAME A VIEW OF MODERN ATHENS

Of the 104 tall fluted columns of the Temple of the Olympian Zeus at Athens only 15 now stand upright. Fragments of the cornice and frieze still stand on top of the cluster of pillars at the left. This largest temple ever built to the ancient Greeks' chief deity was begun by Pisistratus who ruled 500 years before Christ. After many rulers had had a hand in its construction, the temple was dedicated under Hadrian in 129 A.D. Two columns standing apart from the group like sentinels frame a view of Athens' modern buildings across the Ilissus River. One tumbled titan, overthrown by an earthquake, lies like a colossal loaf of French bread sliced for a giant's dinner (Bulletin No. 3).

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General Headquarters, Washington 6, D. C.

Network of Nazi Superhighways May Aid Motorized Yanks

WHEN the Reich's Westwall is thoroughly breached, the superhighways which the Nazis built to expedite invasion of neighboring lands may prove to be military boomerangs. If this happens, a war of movement such as existed after the Normandy breakthrough may carry Allied armies far into the interior of Germany.

Yank divisions on wheels may determine for the first time in the field how fast their jeeps, tanks, and ten-wheelers can travel. For on the motorists'-dream-come-true *Reichsautobahnen,* speed was planned to be limited only by the capabilities of the vehicle.

Autobahnen Built for Automobiles, not Buggies

The *Reichsautobahnen* (literal translation: realm's auto tracks) are 78-foot-wide superhighways. They usually have two three-lane concrete ribbons with a 15-foot strip of park between (illustration, next page). Comparable highways in the United States include the Pennsylvania Turnpike between Pittsburgh and Harrisburg, the metropolitan New York parkway system, and similar multiple-lane roads leading to or connecting large cities all over the country.

The Yanks' first opportunity to sample the German brand of speedway has been between Aachen and the Rur (Roer) River, where a superhighway spur extends toward Cologne (Köln) and the central system.

Begun in 1933, the German motor roads program was made the responsibility of the nation's railroad construction engineers. Roads were built only on new rights-of-way through open country, by-passing towns and cities at a comfortable distance. Grade crossings were forbidden; over- and underpasses averaged two for each mile of construction.

Curves were gradual and gradients low as for the first time in Europe a road system was built for modern high-speed automobiles and was not simply an improvement of horse-and-buggy paths. Foot, cycle, and horsedrawn traffic was barred. Lack of cross traffic made stop lights unnecessary.

Six principal routes were to form a superhighway grid. Two were north-south: Hamburg to Basel in the west, Stettin to Munich (München) and Berchtesgaden in the east. The four west-to-east highways were to run from Hamburg to Königsberg, from Cologne to Frankfurt-on-the-Oder, from Cologne to Breslau, and from Karlsruhe to Munich. Other routes radiate from the Berlin belt road, a superhighway nearly encircling the German capital about 15 miles out.

Reich Roads Looked to Future, and War

Nearly half of 8,500 projected miles of these roads had been completed in the Nazi Reich by 1939 when war forced suspension of the building program. German planners drew heavily on the road-building experience of other nations, especially the United States, which has 15,252 miles of multiple-lane highway. Of this total, 6,878 miles is three-lane highway; 7,872 is four-lane; and 502 is six-lane. The last category is most nearly like the *Reichsautobahnen.*

The entire program was acknowledged to be far in advance of Reich traffic needs. Time has shown that the first reason for it was to provide high-speed military roads so that striking power could be shifted rapidly to support "blitz" invasions of neighbor countries. Reasons stated by Nazi officials at the time were:

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from the Sulu Sea gradually destroyed the rice prosperity.

An epidemic among the carabaos (illustration, below), the islanders' beast of burden, further impoverished Mindoro. To escape the pirates, law-abiding folk took to the interior, while the formerly rich coastlands became the resort of the criminal fringe of the entire central part of the archipelago. Interior tribes today are assumed to be descended from the refugee coastal inhabitants.

Though sugar cane was being exploited by an American company before the war, the chief wealth of the island was its forest products. Wood-cutting and rattan-splitting for the Manila trade was a leading occupation. Cedar, mahogany, gutta-percha, palms, ebony, and gum trees grow in commercial quantities.

Ever since Eric the Red, in 982, found an icy, forlorn arctic island and called it Greenland to induce settlement and publicize the exploit, explorers have often given their discoveries names with sales appeal. Mindoro is one of the many Pacific islands which Spanish explorers named to suggest the presence of gold. It means "mine of gold," but after four centuries it has yet to live up to its name.

Note: Mindoro is shown on the National Geographic Society's Map of Southeast Asia, which was issued as a supplement to the October, 1944, issue of the *National Geographic Magazine*. A price list of maps may be had from the Society's headquarters, Washington 6, D. C.

For further information on the Philippines, see "Mindanao, on the Road to Tokyo," and "Camera Cruising in the Philippines" (12 natural color photographs), in the November, 1944, issue of the *Magazine*; "Facts about the Philippines," February, 1942*; and "Return to Manila," October, 1940*; and these GEOGRAPHIC SCHOOL BULLETINS: "Luzon, Head Island of the Philippines," December 4, 1944; "Leyte, First Steppingstone Toward Manila," November 13, 1944; and "New War Chapter Opens in the Philippines," November 6, 1944. *(Issues marked with an asterisk are included in a special list of Magazines available to teachers in lots of 10 for $1.)*

Bulletin No. 1, January 8, 1945.

Merle Le Voy

THE RACE IS THE THING, BE IT PONIES, BICYCLES, OR CARABAOS

Before war came to San José, site of the airfield which MacArthur's men captured in the initial sweep inland from the beachhead on southwest Mindoro, its citizens occasionally enjoyed watching their favorite carabao being booted home. In everyday life the lumbering carabao, or water buffalo, is the work animal of the Philippines. Though slow, these evenly matched entries apparently provided the thrill at the finish line that any close race gives. In Spanish days, a ruinous epidemic among the carabaos of Mindoro, plus repeated pirate raids, destroyed a rice-based prosperity that has never returned to the island.

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Allies in Europe: 1. Greece

(This is the first of a series of bulletins about countries where Allied forces are operating or may operate.)

GREECE has a dual personality. It is a modern nation playing an important part in Europe's current history. It stands out, too, because of the glory of its past.

Through the centuries Greece has been a bearer of the lamp of knowledge, a treasure land inviting scholar and sojourner to ancient cities, to hills and valleys thickly crusted with history and with fabulous lore about gods and men. Unhappy modern Greece has only recently been freed from three years of Nazi domination.

Greece is a compound of irregular mainland and innumerable islands. The biggest island is Crete, about 60 miles southeast of the mainland. Macedonia, in the north, is the largest mainland division. The southern end of the irregular peninsula that Greece thrusts into the Mediterranean is the Peloponnesus—the Island of Pelops (named for a legendary grandson of the god Zeus, but never really an island until a canal cut the Isthmus of Corinth in 1893).

Mountains Reach toward Sea from "Earth's Navel"

Greece shares its northern frontier with Albania, Yugoslavia, and Bulgaria. Turkey-in-Europe adjoins eastern Thrace. Elsewhere the country is seagirt (map, next page). Total area of mainland and islands about equals that of Alabama.

Mountains roughly parallel the coasts in their north-and-south extent, and angle eastward through Macedonia and Thrace into Turkey. Heights range up to the 9,570 feet of Mt. Olympus, mythical home of the gods. Mt. Parnassus, in central Greece, was anciently regarded as the "navel of the earth." Mountain spurs reach almost to the sea in places and compartmentize the country into many small communities, making communication difficult.

Fertile valleys lie between the ridges, as in Thessaly and Arcadia. Highland lakes appear along the Albania and Yugoslavia borders. The Vardar River, rising in Yugoslavia and flowing across northeastern Greece into the Gulf of Salonika, is an important stream.

Hot winds sweep in from Africa. Chill drafts breathe coldly from the north. Snow is expected in the mountains from October to April. The lowlands escape heavy frosts and snows. Rainfall is heaviest in the west, lightest in the east. Severe droughts dry up streams. They have blighted eastern areas, and accented the need for irrigation.

Currants, Olive Oil, Tobacco Swapped for Coal, Machinery, Cloth

Greeks look to the land as their natural support. Figs, almonds, oranges, citrons, and melons grow well without much care. Currants from vineyards around the Gulf of Corinth were a staple in prewar foreign trade. Rice was cultivated in Macedonia. Apples were a specialty in Thessaly. So-called Fetta cheese—sliced and kept in brine—was a national favorite. Olives were abundant, and provided oil for export. Best of the tobacco leaf went to American buyers. Greece counted her sheep and goats by the million; her cattle, horses, mules, and pigs by the hundred thousand. The seas supported active fisheries.

Mineral output has been valuable over the years, with silver, lead, iron, and zinc the leaders. Production of mines ran to variety rather than volume. In normal times Greek industry required imported coal, machinery, and lubricants. Textiles, sugar, automobiles, and tires rounded out the principal imports.

Greece's three largest cities, with their prewar populations, were: Athens, 652,000; Piraeus, the port of Athens, 328,000; and Salonika, 236,500.

When Greek joins Greek in a social hour, wine mixed with resin might be served, or cups of sweet black coffee. Bread is baked in puffy rings thick as automobile tires. Greeks like it dunked in clabber. Octopuses are in demand in coastal towns as a food delicacy. American ice cream sodas got to Salonika through returned emigrants. Much country cooking was normally done in outdoor ovens. Greeks observed Easter with fireworks as well as candles.

Contrasts were sharp before the war. Shepherds and their flocks blocked traffic. Gypsies roamed the country. Shoppers on Hermes Street in Athens wore modern dress. Ancient ruins rubbed elbows with new buildings (illustration, inside cover). A subway served the capital. Camels and oxen still figured in hinterland transportation.

Sports of ancient Greece achieved a modern recognition in the revival of the Olympic Games. In ancient times wars stopped for these games. Today the Olympics are cancelled during wartime. The modern Marathon is a history lesson as well as a race, for it com-

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that it would show the progressive character of National Socialist government to the world and attract tourists from other countries; that, by encouraging motoring, it would stimulate Germany's automotive industries; that it would give employment to a quarter-million unemployed.

Giving emphasis to the tourist purpose, the Nazi superplanners built along the principal scenic stretches rest houses with luxurious appointments and gasoline stations with services down to first aid and weather news.

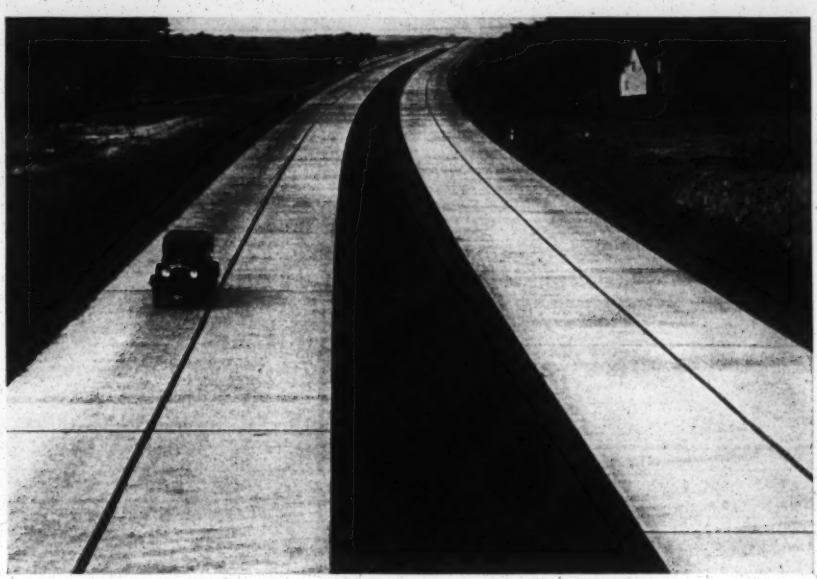
After Nazi expansion successes in the early months of the war, highway building plans were revised to include the invaded Balkans and Low Countries. But by mid-1943 the Germans were reported to have abandoned maintenance of the superhighways inside the Reich and even to have a plan for mining them so that they would not prove an asset to United Nations invaders.

In addition to the spur end near Aachen, superhighways are within striking range of Yank forces in the Saar, French units in Strasbourg, and British troops in the Netherlands. A spur begins at the east edge of the Saar industrial region and connects with the main network in the Rhine valley near Ludwigshafen. Down the Rhine only 40 miles from Strasbourg lies Karlsruhe, southwest cornerstone of the superhighway grid, whence routes lead east and north to all sections of Germany.

Wesel, the northwest anchor of the system, is in the British section of the front. From there highways lead east to Hannover and Berlin and south to the near-by Ruhr.

Note: Germany's superhighways are shown in double red lines on the Society's Map of Germany and Its Approaches, which was published as a supplement to the July, 1944, *Magazine*.

Bulletin No. 2, January 8, 1945.



GERMANY'S DUAL ROADS LED NAZIS TO CONQUEST, BECKON YANKS TO BERLIN

The *Reichsautobahnen*, Nazi-built superhighway system, forms a giant gridwork of express roads independent of Germany's 132,000 miles of ordinary highway. They are park-divided dual ribbons of concrete, each slab carrying one-way traffic. Except for lack of traffic, this scene might be a stretch of the Pennsylvania Turnpike, one of the United States' nearest counterparts to the *Reichsautobahnen*. The fact that Germany's superhighways were built far in advance of civilian needs is demonstrated in this prewar picture by the presence of only two cars. In 1939, the Reich had only one automobile for every 42 persons, while United States registration figures showed almost one automobile for every four inhabitants.

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The Yak, Tibetan All-Purpose Animal, Gave Hair for Wigs

HOLLYWOOD and Broadway producers of costume plays are facing a tough problem because yak hair, used in making actors' wigs, is no longer being imported. Period dramas which cannot be staged without a wardrobe of many wigs may suffer a wartime decline for the simple reason that the long, fine, humanlike hair of a crude Tibetan beast is one of the newest trade casualties of the present worldwide conflict.

Human hair, imported mostly from central Europe, went into prewar wigs. When trade in this commodity was cut off in 1939, the ponderous yak stepped in. Now its brief career in international commerce is temporarily ended and it must go back to its age-old role of beast-of-all-trades for its tribal owners in mountain-girt Tibet.

The yak is as important to the Tibetans as the reindeer is to the Lapp, or the llama to the Peruvian. In addition to supplying shelter, food, and clothing, the animal also provides transportation and is the index of its master's wealth.

Tibetan Whip Hand Holds a Stone

Known as the "grunting ox," the huge humpbacked animal looks awkward, but is remarkably active. It can get down icy mountain slopes by drawing its hoofs together and sliding, always landing right side up. It can swim swift mountain streams. Even when it is heavily loaded, it averages about 20 miles a day.

The wild yak lives on the arid plateaus and in the snowy regions of Tibet—a country of central Asia whose tablelands average more than 16,000 feet in altitude. Although the beast's shoulders may measure more than six feet from the ground, it carries its head very low, its nose almost touching the earth.

The domestic yak, usually a hybrid crossed with Mongolian cattle, is somewhat smaller, more easily managed, and commonly has a black and white coat (illustration, next page). It is guided by a cord passed through the nose cartilage. The skin of the yak is so tough that drivers use stones instead of whips. "Lakto," meaning "hand with a stone," is the native word for yak driver.

Both wild and domesticated varieties have sharp-pointed horns and horny-barbed tongues to pick up grasses and mosses. Both breeds live on "burtsar"—a thick, woody root which the Tibetans use for firewood. A taste for fresh grass and roots causes many domesticated yaks to die of starvation, for they will not touch grain. When on a march, they rarely eat until unloaded.

Meat on the Hoof Meets Open-Air Refrigeration

Long, black, and soft, the hair of the wild yak sweeps the ground when the animal stands upright, or provides an excellent mattress when it burrows into snowdrifts. The coat around the upper part of its face and on its enormous tail is particularly fine and silky.

Tibetans weave fine cloth from the softer hairs, and make tents from the coarser strands. The latter are woven into black and white mats. Attached to yak-hair ropes, these mats are used to cover the stone bases of the semi-nomadic home of the region.

The yak also contributes food and drink for its master. After the animal has been slaughtered, its flesh is left in the icy air. Gradually it shrinks, turns black and becomes hard as wood. It is then cut into chunks ready for roasting.

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memorates the feat of the Greek who ran from Marathon to Athens to bring the news of a victory (490 B.C.) over the Persians. Military students will be reminded that the Greeks had a secret weapon in "Greek fire," an incendiary composition first used in 673 A.D.

Note: Greece is shown on the Society's Map of Central Europe and the Mediterranean, and on the Map of Classical Lands of the Mediterranean on which both ancient and modern names are given and historic events noted.

Reprints of three articles on Greece, two sets of color photographs, and a series of paintings reproduced in full color, which originally appeared in the March and May, 1944, issues of the *National Geographic Magazine,* may be obtained bound together in a heavy cream paper cover. This book, "Classic Greece and the Aegean," is available at 75¢ a copy at the Society's headquarters, Washington 6, D. C.

For additional information on Greece, see "Classic Greece Merges into 1941 News," a series of 19 photographs, in the January, 1941* issue of the *Magazine*; "Modern Odyssey in Classic Lands," March, 1940*.

Bulletin No. 3, January 8, 1945.

GREECE, RIDGED WITH MOUNTAINS, FRINGED INTO PENINSULAS, AND BORDERED WITH ISLANDS, IS A NOTEBOOK OF GEOGRAPHIC SAMPLES

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Geo-Graphic Brevities

RAVENNA IS STOREHOUSE OF EARLY CHRISTIAN ART

RAVENNA, where Canadian forces have pushed back the Adriatic anchor of the German line across Italy, is known as that country's center of early Christian art. Now it is a prize to the Allies because of the highways and railways which radiate from it—west to Bologna, north to Ferrara and industrial towns beyond.

Ravenna is capital of the province of the same name. It lies on the River Po's coastal plain. With about 80,000 inhabitants before the war, Ravenna presents a somber appearance belying its historic rank as a great art center and a temporary capital of the Roman Empire.

Ravenna was once a great port. Because silt from the Po and smaller rivers advances the shore line about eight feet a year, the city now lies six miles from the Adriatic. The soil is gradually sinking, so that foundations of massive churches and tombs built 14 centuries ago are below sea level.

The Corsini Canal, running through fertile farmlands, connects Ravenna with the Adriatic. A network of drainage canals has reclaimed much swampy land.

Ravenna's skyline is nearly as level as its ground-line, except for church towers and domes. Business sections present a typical Mediterranean aspect—paved squares are walled in by colonnaded low buildings with stucco facades, balconied windows, and red-tiled flat roofs.

Prewar Ravenna provided a market for the surrounding farms. Railroads ran to Rimini, Bologna, and Ferrara. Wine making, silk spinning and weaving, manufacture of musical instruments and glass were leading industries.

Lagoons and marsh surrounded Venice-like Ravenna in early times. A causeway, easily defended, connected it with the mainland. When the Roman Empire began to crumble in the 5th century A.D., the last few harried emperors abandoned Rome and made defensively strong Ravenna their capital.

Theodoric, King of the Ostrogoths, conqueror who followed the Roman emperors, built many churches and a great palace. He was buried there in a tomb capped by a single dome-like rock 36 feet in diameter.

The third and most distinctive period of Ravenna's building came after 527, when the Eastern Roman Empire under Justinian reconquered Italy. For two centuries Ravenna was ruled from Constantinople. At this time were built the many mosaic-covered structures of Byzantine design. These still rank the city as one of the world's greatest centers of Byzantine art.

Dante in medieval times and Byron in the 19th century did some of their best writing in Ravenna. Dante died and was buried there. News accounts indicate that his tomb and Theodoric's palace were undamaged by Allied shelling.

Garibaldi, Italian patriot, made a masterful retreat from Rome to Ravenna after the premature attempt to unify Italy in 1849.

Note: Ravenna may be located on the Society's Map of Central Europe and the Mediterranean, which was issued as a supplement to the October, 1939, *Magazine*.

* * * * *

SCIENTISTS STUDY SALT-WATER SHARKS FROM FRESH-WATER LAKE NICARAGUA

THE riddle of a stranger-than-fiction fish story may be solved when scientists finish their current study of *Eulamia nicaraguensis*. By this long name goes the world's only known fresh-water shark. How this traditionally salt-water fish

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Butter made from yak milk is highly nutritious. The most popular Tibetan drink is butter tea—tea and butter churned together. Only the well-to-do use yak butter; the poor eat goat butter.

Yak-Mounted Messenger the Pony Express of Tibet

Natives make saddles, boots, and whips from leather stripped from the back and shoulders. The skin from the legs, not quite so durable, goes into soft Tibetan boots. Even the tail is used; dyed red, it becomes a "chownie," or fly flapper, a necessary adjunct to all state and ceremonial processions in India. Long poles adorned with yak tails are also placed in front of tombs and religious shrines.

In some sections of Tibet, the yak-mounted messenger is the only means of communication. In 1938, Tibet—whose 463,000 square miles make it somewhat less in size than the combined areas of Montana, Washington, Oregon, and California—had only 144 miles of telegraph lines to serve a population varying in estimates from under a million to more than three million.

Note: Tibet, home of the yak, is shown on the Society's Map of Asia and Adjacent Areas, which was published as a supplement to the December, 1942, issue of the *National Geographic Magazine*.

For information about the countries where the yak is a familiar domestic animal, see "Exploring Wild West China," in the *National Geographic Magazine* for June, 1944; and "Climbing Mighty Minya Konka, Landmark of China's New Skyway," May, 1943*.

Bulletin No. 4, January 8, 1945.

Ray G. Johnson

THIS YAK NO LONGER SENDS HIS HAIR TO HOLLYWOOD

The yak, chief work animal of Tibet, is as characteristic of that country as the water buffalo is of China. This paleface yak is the pride of the herd of the Lihwa Lamasery (background), in China's wild-west province of Sikang. If it were not for wartime transportation restrictions the luxuriant hair on this patchwork yak and his black companion (right) might be Hollywood bound to appear as wigs in some colossal screen production. The yak has a head like a cow, a tail like a horse, a voice like a pig, and a coat which hangs down around its feet like the valance of a slip cover on an armchair. It furnishes transportation, milk, butter, and hair for fabric, felt, and wigs. According to one member of a Geographic expedition, the yak does almost everything useful but lay eggs. Although ancient Lihwa is now Chinese, Tibetan ways of life prevail. The lamas' influence extends beyond Tibet's borders and lamaseries sprawl in high valleys of western China.

adapted itself to the fresh-water surroundings of Lake Nicaragua is a question that has long puzzled scientists.

Dr. Alexander Wetmore, Assistant Secretary of the Smithsonian Institution, was one of the puzzled scientists. He asked Luis Marden, staff writer and photographer for the *National Geographic Magazine*, and an ardent fisherman, to try his luck with these man-eating sharks and to ship one of them back to the museum if he caught any.

In 1944, while in Nicaragua on assignment from the Geographic, Marden took a day off and went shark fishing. He landed several of the sharks and sent three of them to the National Museum in Washington, D. C.

These sharks weighed 98, 76, and 48 pounds. They were the first complete specimens of Nicaragua's fresh-water sharks to be received by any scientific institution.

Luis Marden

A ROD WITH A SIX-OUNCE TIP SUBDUED THIS KILLER

Battling two hours, a *National Geographic Magazine* staff correspondent boated this 112-pound fresh-water shark, after easily catching several with heavier tackle. Three were shipped to the Smithsonian Institution in Washington, D. C. for study. Lake Nicaragua sharks, often weighing as much as 200 pounds, are so numerous that bathing in deep water is a suicidal pastime. Rarely does a year pass that they do not take at least one human life. Like their salt-water brothers, Nicaragua's landlocked man-eaters have several rows of teeth. Each shark is his own dentist, as new teeth grow in when old ones are broken off.

Sawfish, tarpon, and other species of large salt-water fish also live in oval, 100-mile-long Lake Nicaragua, 105 feet above the level of the near-by Pacific only 12 miles to the west.

Geologists believe that this lake, the largest in all Central America, was a deep bay of the Pacific Ocean until an earthquake heaved up land that locked out the bay and trapped the fish.

Streams and springs in this region of very heavy rainfall gradually turned the lake water fresh.

The San Juan River — Lake Nicaragua's only outlet—flows eastward into the Caribbean Sea, 75 air miles away.

Note: Lake Nicaragua, home of the fresh-water shark, appears on the National Geographic Society's Map of Mexico, Central America, and the West Indies.

See also, in the *National Geographic Magazine* for August, 1944, "A Land of Lakes and Volcanoes."

Bulletin No. 5, January 8, 1945.